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Indian Standard

METHODS OF TEST FOR
NATURAL RUBBER LATEX

PART 2 DETERMINATION OF SLUDGE CONTENT

NRL : 5

(*First Revision*)

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Indian Standard

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Indian Standard

METHODS OF TEST FOR NATURAL RUBBER LATEX

PART 2 DETERMINATION OF SLUDGE CONTENT

NRL : 5

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (Part 2) (First Revision) was adopted by the Indian Standards Institution on 8 March 1985, after the draft finalized by the Rubber Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 Test methods for rubber latex had been originally covered in the following Indian Standards:

For natural rubber latex

IS : 3708 (Part 1)-1966*

IS : 3708 (Part 2)-1968†

For styrene-butadiene rubber latex

IS : 4511 (Part 1)-1967‡

Since some of the test methods covered in the above standards were common, the concerned committee had decided some years ago to unify and publish a separate series of methods of test which would be applicable to all types of latices — natural as well as synthetic. Accordingly, the following six test methods had been covered under IS : 9316:

IS : 9316 methods of test for rubber latex:

Part 1-1979 Determination of surface tension

*Methods of test for natural rubber latex: Part 1 Dry rubber content, sludge content, density, total alkalinity, KOH-number, mechanical stability, volatile fatty acid number, pH, total nitrogen, total copper, total iron, total manganese and total ash.

†Methods of test for natural rubber latex, Part 2.

‡Methods of tests for styrene-butadiene rubber (SBR) latices: Part 1 Determination of dry polymer, pH, density, residual styrene, bound styrene and soap content.

IS : 3708 (Part 2) - 1985

- Part 2-1979 Determination of viscosity
- Part 3-1979 Determination of coagulum content
- Part 4-1979 Determination of total solids content
- Part 5-1979 Drawing of samples
- Part 6-1982 Determination of pH

0.2.1 As a result of further rethinking on the subject, it has now been decided to re-designate the test methods common to natural and synthetic rubber latices as RL series; test methods for natural rubber latex as NRL series and test methods for styrene-butadiene rubber latex as SBRL series. Consequently, test methods for rubber latex have been rationalized into the following three series:

- a) IS : 9316 Unified methods of test applicable to both natural and synthetic rubber latices — RL series;
- b) IS : 3708 Methods of test applicable to natural rubber latex — NRL series; and
- c) IS : 4511 Methods of test applicable to styrene-butadiene rubber latex — SBRL series.

0.3 The existing Indian Standards under IS : 3708 (Parts 1* and 2†), IS : 4511 (Part 1‡) and IS : 9316 (Parts 1 to 6) are being gradually replaced by separate standards under the above three series, designated by the appropriate NRL, SBRL, or RL series, respectively.

0.3.1 The methods covered under NRL 13, NRL 14 and NRL 15 of IS : 3708 (Part 1)-1966 which are also under revision have been proposed to be covered under the RL series in IS : 9316 (*under revision*).

0.4 In order to facilitate cross-reference, it has been decided to retain the original discrete NRL series numbers assigned to various test methods, in IS : 3708 (Parts 1 and 2) in the revised parts of IS : 3708.

0.4.1 For proper referencing of the existing test methods and the new methods under revision, a statement showing corresponding methods is given in Appendix A.

0.5 In preparing the above series, the need to align the test methods with the corresponding ISO standards/DIS/DP wherever available has also been taken into account for updating the test methods. In the preparation of this standard, assistance has been derived from ISO 2005-1974 'Natural rubber latex — Determination of sludge content', issued by the International Organization for Standardization.

*Methods of test for natural rubber latex: Part 1 Dry rubber content, sludge content, density, total alkalinity, KOH-number, mechanical stability, volatile fatty acid number, pH, total nitrogen, total copper, total iron, total manganese and total ash.

†Methods of test for natural rubber latex, Part 2.

‡Methods of tests for styrene-butadiene rubber (SBR) latices: Part 1 Determination of dry polymer, pH, density, residual styrene, bound styrene and soap content.

0.6 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard (Part 2) prescribes a method for the determination of sludge content of natural rubber latex of *Hevea brasiliensis*, uncompounded and unvulcanized, and subjected to some type of concentration process other than heat concentration and which may contain preservatives.

2. OUTLINE OF THE METHOD

2.1 The latex is centrifuged and the resultant sludge is repeatedly washed with ammonia-alcohol solution. The sludge is then dried to constant mass.

3. APPARATUS

3.1 Centrifuge — Capable of producing a mean acceleration of approximately $12\,000\text{ m/s}^2$ with two 50-ml conical centrifuge tubes.

3.2 Pipette — with an aperture of about 2 mm diameter.

3.3 Hot Plate

3.4 Air Oven — capable of being controlled at $70 \pm 2^\circ\text{C}$.

3.5 Chemical Balance

4. REAGENTS

4.1 Ammonia-Alcohol Mixture — Prepare the mixture with the following:

Ammonium hydroxide (R.D. 0.90)	10 ml
Denatured alcohol (see IS : 324-1959†) or rectified spirit (see IS : 323-1959‡)	340 ml
Water	1 000 ml

*Rules for rounding off numerical values (revised).

†Specification for ordinary denatured spirit (revised).

‡Specification for rectified spirit (revised).

5. PROCEDURE

5.1 Carry out the determination in duplicate, using the two centrifuge tubes to counterbalance each other. Into each tube weigh, to the nearest 0.1 g, about 45 g of the well-mixed sample. Cover the end of each tube to prevent formation of a surface skin during centrifuging and centrifuge them for 20 minutes at a mean acceleration of approximately 12000 m/s². As the creaming is considerable, scoop off most of the heavy top layer with a long handled porcelain spoon before pipetting. Using a pipette draw off the supernatant latex to approximately 10 mm above the top of the sludge. Fill the tubes to the top with the ammonia-alcohol mixture and balance them in pairs. Re-centrifuge for 25 minutes. Again pipette off the supernatant liquid to approximately 10 mm above the top of the sludge. Repeat this procedure until the supernatant solution is clear after centrifuging. After the final centrifuging, drain the tubes to the 10 mm mark and transfer the residues to a tared 200-ml heat-resistant beaker using a rubber policeman and wash bottle containing some of the ammonia-alcohol mixture. Evaporate to a low level on a hot plate and then complete the drying in an air oven at $70 \pm 2^\circ\text{C}$ until the loss in mass is less than 1 mg during a period of 30 min.

6. CALCULATION

6.1 Calculate the sludge content of the latex as follows:

$$\text{Sludge content, percent by mass} = \frac{M_1}{M_2} \times 100$$

where

M_1 = mass in g of the dried sludge, and

M_2 = mass in g of the sample.

6.2 A difference of 0.002 percent between the two results is not considered significant.

APPENDIX A

(Clause 0.4.1)

TABLE SHOWING CORRESPONDENCE OF THE VARIOUS METHODS OF TEST COVERED IN THE EXISTING IS : 9316 (PARTS 1 TO 5)-1979, IS : 9316 (PART 6)-1982, IS : 3708 (PART 1)-1966, IS : 3708 (PART 2)-1968, IS : 4511 (PART 1)-1967 WITH THE REVISION/PROPOSED REVISION OF IS : 9316, IS : 3708 AND IS : 4511

EXISTING TEST METHODS			PROPOSED REVISION		REMARKS
Test Method	IS No.	Part (Series)	IS No.	Series	
(1)	(2)	(3)	(4)	(5)	
RL SERIES					
Determination of surface tension	IS : 9316-1979	Part 1	IS : 9316	Part 1 (RL : 1)	} Under Revision
Determination of viscosity	IS : 9316-1979	Part 2	IS : 9316	Part 2 (RL : 2)	
Determination of coagulum content	IS : 9316-1979	Part 3	IS : 9316	Part 3 (RL : 3)	
Determination of total solids content	IS : 9316-1979	Part 4	IS : 9316	Part 4 (RL : 4)	
Drawing of samples	IS : 9316-1979	Part 5	IS : 9316	Part 5 (RL : 5)	
Determination of pH	IS : 9316-1982	Part 6	IS : 9316	Part 6 (RL : 6)	
Determination of total copper	IS : 3708-1966	Part 1 (NRL : 13)	IS : 9316	Part 7 (RL : 7)	
Determination of total iron	IS : 3708-1966	Part 1 (NRL : 14)	IS : 9316	Part 8 (RL : 8)	
Determination of total manganese	IS : 3708-1966	Part 1 (NRL : 15)	IS : 9316	Part 9 (RL : 9)	
NRL SERIES					
Determination of dry rubber content	IS : 3708-1966	Part 1 (NRL : 1)	IS : 3708	Part 1 (NRL : 1)	
Determination of sludge content	IS : 3708-1966	Part 1 (NRL : 5)	IS : 3708	Part 2 (NRL : 5)	
Determination of density	IS : 3708-1966	Part 1 (NRL : 6)	IS : 3708	Part 3 (NRL : 6)	
Determination of total alkalinity	IS : 3708-1966	Part 1 (NRL : 7)	IS : 3708	Part 4 (NRL : 7)	
Determination of KOH-number	IS : 3708-1966	Part 1 (NRL : 8)	IS : 3708	Part 5 (NRL : 8)	
Determination of mechanical stability	IS : 3708-1966	Part 1 (NRL : 9)	IS : 3708	Part 6 (NRL : 9)	

IS : 3708 (Part 2) - 1985

EXISTING TEST METHODS			PROPOSED REVISION		REMARKS	
Test Method	IS : No.	Part (Series)	IS : No.	Series		
(1)	(2)	(3)	(4)	(5)		
(1)	(2)	(3)	(4)	(5)		
NRL SERIES						
Determination of volatile fatty acid number	IS : 3708-1966	Part 1 (NRL : 10)	IS : 3708	Part 7 (NRL : 10)	Under Revision	
Determination of total nitrogen	IS : 3708-1966	Part 1 (NRL : 12)	IS : 3708	Part 8 (NRL : 12)		
Determination of total ash	IS : 3708-1966	Part 1 (NRL : 16)	IS : 3708	Part 9 (NRL : 16)		
Determination of boric acid	IS : 3708-1968	Part 2 (NRL : 17)	IS : 3708	Part 10 (NRL : 17)		
Determination of magnesium	IS : 3708-1968	Part 2 (NRL : 18)	IS : 3708	Part 11 (NRL : 18)		
SBRL SERIES						
Determination of dry polymer	IS : 4511-1967	Part 1 (SBRL : 1)	IS : 4511	Part 1 (SBRL : 1)		
Determination of density	IS : 4511-1967	Part 1 (SBRL : 6)	IS : 4511	Part 2 (SBRL : 6)		
Determination of residual styrene (volatile unsaturates)	IS : 4511-1967	Part 1 (SBRL : 8)	IS : 4511	Part 3 (SBRL : 8)		
Determination of bound styrene	IS : 4511-1967	Part 1 (SBRL : 9)	IS : 4511	Part 4 (SBRL : 9)		
Determination of soap content	IS : 4511-1967	Part 1 (SBRL : 10)	IS : 4511	Part 5 (SBRL : 10)		

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